

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

<b>In Re Reissue Application of:</b>	Dinh et al.
<b>U.S. Patent No.</b>	6,019,789
<b>and Issue Date:</b>	February 1, 2000
<b>Reissue Filing Date:</b>	February 1, 2002
<b>For:</b>	Expandable Unit Cell and Intraluminal Stent
<b>Examiner:</b>	Not yet assigned
<b>Group Art Unit:</b>	Not yet assigned

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Commissioner for Patents  
Washington, D.C. 20231

Docket No: S63.2-10389

PRELIMINARY AMENDMENT

Before beginning examination and calculating the fees in this reissue application, please amend the above-identified reissue application as indicated below:

In the Claims

Please add new claims 16-37 as follows:

16. A stent comprising a plurality of serpentine circumferential bands, adjacent serpentine circumferential bands connected one to the other, the serpentine circumferential bands including first serpentine circumferential bands of a first shape and second serpentine circumferential bands of a second shape different from the first shape, every first serpentine circumferential band being adjacent to a second serpentine circumferential band and every second serpentine circumferential band being adjacent to a first serpentine circumferential band.

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17. The stent of claim 16 wherein adjacent first and second serpentine circumferential bands are connected one to the other via a plurality of longitudinally extending connectors.
18. The stent of claim 17 wherein the first serpentine circumferential band has a width which differs from the width of the second serpentine circumferential band.
19. The stent of claim 16 wherein the first serpentine circumferential band has a width which differs from the width of the second serpentine circumferential band.
20. The stent of claim 17 wherein the serpentine circumferential bands comprise alternating peaks and troughs, the stent including adjacent first and second serpentine circumferential bands which are connected only via longitudinal connectors which extend between peaks of the first and second serpentine circumferential bands and adjacent first and second serpentine circumferential bands which are connected only via longitudinal connectors which extend between troughs of the first and second serpentine circumferential bands.
21. The stent of claim 18 wherein the serpentine circumferential bands comprise alternating peaks and troughs, the stent including adjacent first and second serpentine circumferential bands which are connected only via longitudinal connectors which extend between peaks of the first and second serpentine circumferential bands and adjacent first and second serpentine circumferential bands which are connected only via longitudinal connectors which extend between troughs of the first and second serpentine circumferential bands.
22. The stent of claim 16 wherein adjacent serpentine circumferential bands are connected one to the other via one or more longitudinally extending connectors.
23. The stent of claim 22 comprising first longitudinal connectors of a first length and second longitudinal connectors of a second length less than the first length.
24. The stent of claim 22 wherein the serpentine circumferential bands comprise alternating peaks and troughs, the stent comprising first longitudinal connectors of a first length and second longitudinal connectors of a second length less than the first

length, the first longitudinal connectors extending between peaks of some adjacent serpentine circumferential bands and between troughs of other adjacent serpentine circumferential bands, the second longitudinal connectors extending between peaks and troughs.

25. A stent comprising a plurality of loop members, the loop members arranged to form first bands extending about the circumference of the stent, each first band comprising alternating peaks and troughs, each peak separated from a trough adjacent thereto by a bent portion of a loop member, first bands which are adjacent one another separated one from the other by a second band, each second band connected to each first band adjacent thereto.
26. The stent of claim 25 wherein first and second bands which are adjacent one another are connected one to the other via longitudinally extending connectors.
27. The stent of claim 26 wherein each second band is in the form of two adjacent, out of phase, interconnected serpentine structures.
28. A stent comprising a plurality of circumferential serpentine bands including first circumferential serpentine bands and second circumferential serpentine bands, the first circumferential serpentine bands having a width in excess of the width of the second circumferential serpentine bands, circumferential serpentine bands which are adjacent one another connected one to the other.
29. The stent of claim 28 wherein adjacent circumferential serpentine bands are connected one to the other via one or more longitudinal connectors.
30. The stent of claim 28 wherein each first circumferential serpentine band is adjacent a second circumferential serpentine band and each second circumferential serpentine band is adjacent a first circumferential serpentine band.
31. The stent of claim 28 wherein the first circumferential serpentine bands have an amplitude in excess of the amplitude of the second serpentine bands.
32. The stent of claim 29 wherein the first circumferential serpentine bands have an amplitude in excess of the amplitude of the second serpentine bands.

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33. The stent of claim 32 wherein each first circumferential serpentine band is adjacent a second circumferential serpentine band and each second circumferential serpentine band is adjacent a first circumferential serpentine band.
34. A cell for use in a stent, the cell comprising a first bent end characterized by a first width and a second bent end characterized by a second width different from the first width, the first end connected to the second end.
35. The cell of claim 34 wherein the first and second ends are connected to one another via longitudinal connectors.
36. A stent comprising a plurality of the cells of claim 35 the cells arranged in bands extending about the circumference of the stent, the bands arranged along the length of the stent.
37. The stent of claim 36 wherein the first ends of circumferentially adjacent cells form a first circumferential band with a first amplitude and the second ends of circumferentially adjacent cells form a second circumferential band with a second amplitude less than the first amplitude.

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**REMARKS**

This Preliminary Amendment accompanies a reissue application for U.S. 6,019,789. New claims 16-37 have been added. Support for the new claims is found in Figure 1B of the issued patent.

Issued claims 1-15 are pending as are new claims 16-37.

Respectfully submitted,

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1. A unit cell for use in a stent adapted to be expanded to conform to the dimensions of a vessel, comprising;
  - (i) an elongate connecting bar extending in a direction normal to the direction of stent expansion,
  - (ii) associated with each end of said connecting bar, a first arm and a second arm, each arm being attached to the connecting bar associated end at an inner arm end for pivotal movement away from one another with stent expansion, said first and second arms having outer arm ends which are moved outwardly, with respect to the connecting bar, with such pivotal movement, and
  - (iii) an expandable looped member connecting the outer arm ends in each pair of first and second arms, said looped member having an axial extremity which moves axially inwardly, with respect to the associated connecting bar end, with stent expansion,said arms and expandable looped members being constructed and dimensioned so that the radial outward distance traveled by the arms' outer ends in each pair of first and second arms is approximately equal to the axial inward distance traveled by the associated looped member extremity, as the stent is expanded.
2. The unit cell of claim 1, wherein said first and second arms in each pair are connected to said looped members through a shoulder member.
3. The unit cell of claim 2, wherein said shoulder member is a U-shaped, N-shaped or W-shaped shoulder member.
4. The unit cell of claim 1, wherein said looped members have an undulating configuration.
5. A stent adapted to be expanded to conform to the dimensions of a vessel, comprising a plurality of unit cells, each unit cell composed of
  - (i) an elongate connecting bar extending in a direction normal to the direction of stent expansion,
  - (ii) associated with each end of said connecting bar, a first arm and a second arm, each arm being attached to the associated connecting bar end at an inner arm, for pivotal movement away from one another with stent expansion, said first and second arms having outer arm ends which are moved outwardly, with respect to the connecting bar, with such pivotal movement, and

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(iii) an expandable looped member connecting the outer arm ends in each pair of first and second arms, said looped member having an axial extremity which moves axially inwardly, with respect to the associated connecting bar end, with stent expansion,

said arms and expandable looped members being constructed and dimensioned so that the axial outward distance traveled by the arms' outer ends in each pair of first and second arms is approximately equal to the axial inward distance traveled by the associated looped member extremity, as the stent is expanded.

6. The stent of claim 5, wherein said first and second arms in each pair are connected to said looped members through a shoulder member.

7. The stent of claim 6, wherein said shoulder member is a U-shaped, N-shaped or W-shaped shoulder member.

8. The stent of claim 5, wherein said axial extremity in each of said looped members has an undulating configuration.

9. The stent of claim 5, wherein said plurality of unit cells is connected to one or more axially adjacent plurality of unit cells by at least one connecting segment extending between two axially adjacent axial extremities.

10. The stent of claim 9, wherein each plurality of unit cells includes between 3-500 unit cells.

11. The stent of claim 9, wherein the stent has an expansion ratio, taken as the diameter of the stent after expansion to the diameter before expansion, of between 1-10.

12. The stent of claim 11, wherein the expansion ratio is varied by varying the axial length, taken as the distance between axial extremities in a unit cell, of the unit cells in each plurality of unit cells.

13. The stent of claim 11, wherein the expansion ratio is varied by varying the number of unit cells in each plurality.

14. The stent of claim 9, wherein said connecting segment is a U-shaped looped segment.

15. The stent of claim 5, which further includes an outer stent surface on which a polymer stent is carried, said stent and polymer stent designed for coexpansion in response to an applied force.

16. A stent comprising a plurality of serpentine circumferential bands, adjacent serpentine circumferential bands connected one to the other, the serpentine circumferential bands including first serpentine circumferential bands of a first shape and second serpentine circumferential bands of a second shape different from the first shape, every first serpentine circumferential band being adjacent to a second serpentine circumferential band and every second serpentine circumferential band being adjacent to a first serpentine circumferential band.
17. The stent of claim 16 wherein adjacent first and second serpentine circumferential bands are connected one to the other via a plurality of longitudinally extending connectors.
18. The stent of claim 17 wherein the first serpentine circumferential band has a width which differs from the width of the second serpentine circumferential band.
19. The stent of claim 16 wherein the first serpentine circumferential band has a width which differs from the width of the second serpentine circumferential band.
20. The stent of claim 17 wherein the serpentine circumferential bands comprise alternating peaks and troughs, the stent including adjacent first and second serpentine circumferential bands which are connected only via longitudinal connectors which extend between peaks of the first and second serpentine circumferential bands and adjacent first and second serpentine circumferential bands which are connected only via longitudinal connectors which extend between troughs of the first and second serpentine circumferential bands.
21. The stent of claim 18 wherein the serpentine circumferential bands comprise alternating peaks and troughs, the stent including adjacent first and second serpentine circumferential bands which are connected only via longitudinal connectors which extend between peaks of the first and second serpentine circumferential bands and adjacent first and second serpentine circumferential bands which are connected only via longitudinal connectors which extend between troughs of the first and second serpentine circumferential bands.
22. The stent of claim 16 wherein adjacent serpentine circumferential bands are connected one to the other via one or more longitudinally extending connectors.
23. The stent of claim 22 comprising first longitudinal connectors of a first length and second longitudinal connectors of a second length less than the first length.
24. The stent of claim 22 wherein the serpentine circumferential bands comprise alternating peaks and troughs, the stent comprising first longitudinal connectors of a first length and second longitudinal connectors of a second length less than the first length, the first longitudinal connectors extending between peaks of some adjacent serpentine circumferential bands and between troughs of other adjacent serpentine circumferential bands, the second longitudinal connectors extending between peaks and troughs.
25. A stent comprising a plurality of loop members, the loop members arranged to form first bands extending about the circumference of the stent, each first band comprising

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alternating peaks and troughs, each peak separated from a trough adjacent thereto by a bent portion of a loop member, first bands which are adjacent one another separated one from the other by a second band, each second band connected to each first band adjacent thereto.

26. The stent of claim 25 wherein first and second bands which are adjacent one another are connected one to the other via longitudinally extending connectors.
27. The stent of claim 26 wherein each second band is in the form of two adjacent, out of phase, interconnected serpentine structures.
28. A stent comprising a plurality of circumferential serpentine bands including first circumferential serpentine bands and second circumferential serpentine bands, the first circumferential serpentine bands having a width in excess of the width of the second circumferential serpentine bands, circumferential serpentine bands which are adjacent one another connected one to the other.
29. The stent of claim 28 wherein adjacent circumferential serpentine bands are connected one to the other via one or more longitudinal connectors.
30. The stent of claim 28 wherein each first circumferential serpentine band is adjacent a second circumferential serpentine band and each second circumferential serpentine band is adjacent a first circumferential serpentine band.
31. The stent of claim 28 wherein the first circumferential serpentine bands have an amplitude in excess of the amplitude of the second serpentine bands.
32. The stent of claim 29 wherein the first circumferential serpentine bands have an amplitude in excess of the amplitude of the second serpentine bands.
33. The stent of claim 32 wherein each first circumferential serpentine band is adjacent a second circumferential serpentine band and each second circumferential serpentine band is adjacent a first circumferential serpentine band.
34. A cell for use in a stent, the cell comprising a first bent end characterized by a first width and a second bent end characterized by a second width different from the first width, the first end connected to the second end.
35. The cell of claim 34 wherein the first and second ends are connected to one another via longitudinal connectors.
36. A stent comprising a plurality of the cells of claim 35 the cells arranged in bands extending about the circumference of the stent, the bands arranged along the length of the stent.
37. The stent of claim 36 wherein the first ends of circumferentially adjacent cells form a first circumferential band with a first amplitude and the second ends of circumferentially adjacent cells form a second circumferential band with a second amplitude less than the first amplitude.

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